

Studio System™



Safe for the office

The Studio System eliminates lasers and loose powders often associated with metal 3D printing, making it safe to use in any facility.

Easy to use

With simplified model prep, hand-removable supports, and sized to fit through an office door, the Studio System makes it easy to print metal parts in-house.

Built to scale

The system is modular by design and built for batch processing—allowing users to scale for unique production requirements.

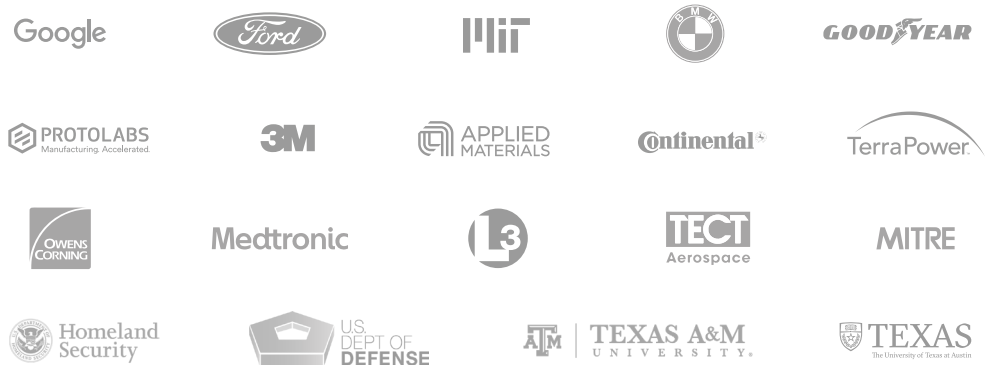
About Desktop Metal

Desktop Metal is accelerating the transformation of manufacturing with end-to-end metal 3D printing solutions. Founded in 2015 by leaders in advanced manufacturing, metallurgy, and robotics, the company is addressing the unmet challenges of speed, cost, and quality to make metal 3D printing an essential tool for engineers, designers and manufacturers around the world.

Highlights

- \$438M in funding
- 200+ engineers, 25 Ph.D.s
- 4 MIT professors (co-founders)
- 100+ patents in process covering 200+ inventions
- Adopted by industrial companies
- 85 resellers in 48 countries

Customers



BMD Technology

The Studio System is designed around the chemistry and powder supply chain of the Metal Injection Molding (MIM) industry. Leveraging this mature, multi-billion dollar global industry gives Desktop Metal customers proven and reliable metallurgy. The images below shows how the Studio System Hardware makes the Bound Metal Deposition™ (BMD) process accessible for users.

	BMD	MIM
Specially-formulated feedstock vs. mixed metal powder The BMD process starts with specially formulated bound metal rods—metal powder held together by wax and polymer binders—a formation similar to the binder and metal powder mixture used in metal injection molding (MIM).		
Printing (no tooling required) vs. injection molding The first step in each process is forming a “green” part. In MIM, this is done by injecting a metal powder-binder mixture into a mold. With BMD, the part’s form is created by extruding bound metal rods layer by layer in a carefully controlled process.		
Debind When a green part is shaped, The system is modular by design and built for batch processing—allowing users to scale for unique production requirements. In both processes, this part is immersed into a debind solution to remove primary wax binder—creating a porous structure throughout the part in preparation for sintering.		
Sinter As the part is heated to temperatures near melting, remaining polymer binder is removed and metal particles fuse together, causing the part to densify to a solid metal part. During this process, the part’s form shrinks roughly 15% as the binder is removed and only metal particles remain.		

Materials

*in development

The Studio System is designed for multi-material compatibility and effortless material changes. Leveraging well-studied alloys from the Metal Injection Molding (MIM) industry, Studio System materials are specially formulated into safe-to-handle bound metal rods, resulting in less shrinkage and higher sintering density than alternative extrusion-based technologies. Please visit desktopmetal.com for current availability.

17-4 PH
Stainless Steel

316L
Stainless Steel

Copper*
High Purity Copper

Alloy 625*
Nickel Based Superalloy

H13*
Tool Steel

4140*
Low Alloy Steel

Key Use Cases

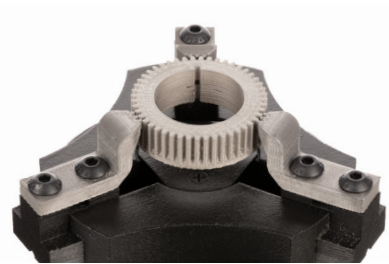
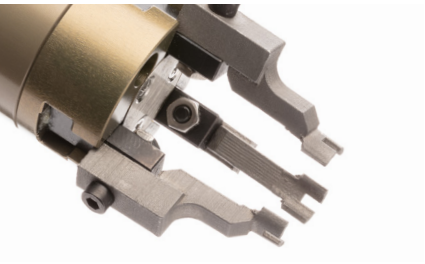
01 Functional Prototyping

Quickly move from design to prototype using production grade materials. Rapidly test and iterate to accelerate product development timelines and improve time to market.



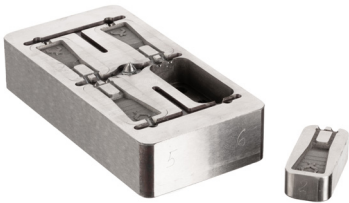
02 Jigs & Fixtures

Streamline assembly, joining, and inspection operations on your shop floor with 3D printed components. Quickly manufacture complex jigs and fixtures that can stand up to extreme manufacturing environments.



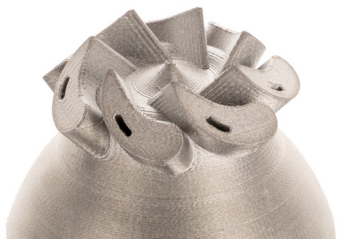
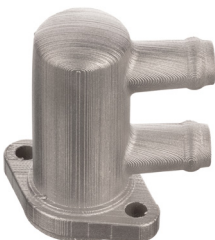
03 Manufacturing Tools

Print tools to support a variety of molding, stamping, and extrusion applications. Utilize the near-net-shape capability of the Studio System to produce tooling components with greatly reduced post-processing.



04 Low Volume Production

Replace cost-prohibitive setups and tooling, long lead-time castings and difficult machining operations by printing complex components directly with the Studio System.

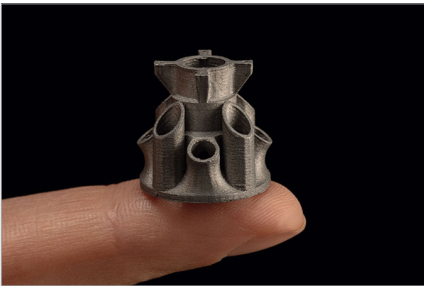


Printer

The printer extrudes bound metal rods to shape “green” parts — similar to how an FFF printer works. This eliminates the safety requirements often associated with laser-based metal 3D printing which use loose powder and enables new features like closed-cell infill for lightweight strength.



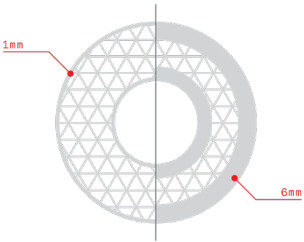
Bound Metal Rods vs. Filament
Bound metal rods allow higher loading of metal powder to binder as they do not require the flexibility of a spooled filament. Rods also enable Desktop Metal’s unique “pusher” feed mechanism for increased part density.



Variable Resolution Printing
Easily swapping between standard and high resolution printheads (400 vs 250 micron nozzle size) allows optimum build quality and process time for both small and large parts.



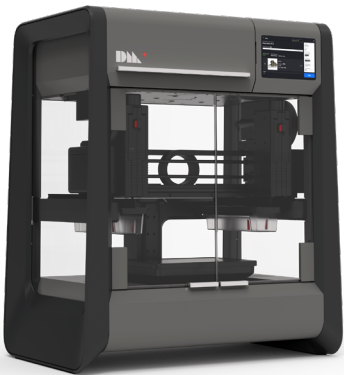
Ceramic Release Layer with Anti-Mold Lock
Allows easy post processing of complex shapes; no cutting tools required to remove complex support structures.



Variable Shell Thickness
Parts printed on the Studio System feature an interior lattice infill structure and exterior shell. User-adjustable shell thickness allows for the flexibility to achieve higher part strength and more room for post processing.

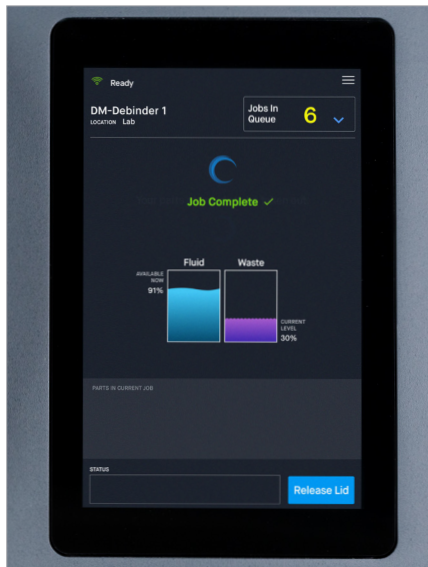


Fast, Easy Material Changeover
Quick-release printheads and easy-to-swap material cartridges allow material changes in a matter of minutes with no cross contamination.



Debinder

The debinder removes primary binder and prepares parts for sintering. This is the only solvent debind equipment designed specifically for office-friendly metal 3D printing. With single-chamber processing, parts go in dry and come out dry and require no manual intervention mid-cycle.



Fully Automated Processing

Manual intervention and guesswork are completely eliminated with the Studio System debinder. Simply load parts as instructed by Fabricate and press start. The system will alert you when the cycle is complete.



Safe for Your Office and Your Staff

Solvents are only present when the unit is closed. This eliminates the need for ventilation and requires no Personal Protection Equipment (PPE) for operation.



Disposable Waste Canister

Solvent is distilled and recycled after each use. Waste is stored in an easily accessible canister at the front of the unit. When the canister is full, the system will alert you to swap it out.



Large Capacity Debind

The debind tray features adjustable shelving which allows multiple parts to be processed together — saving time and enabling efficient batch processing. Part placement is determined by the software and a placement guide is presented on the on-board display.



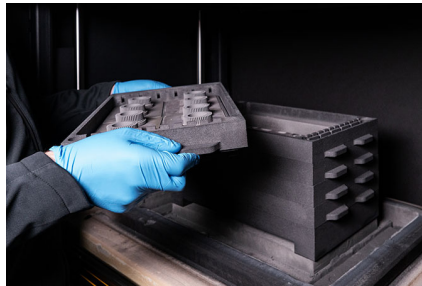
Furnace

Fully-automated and sized to fit through an office door, the furnace delivers industrial-strength sintering in an office-friendly package. Built-in temperature profiles tuned to every build and material ensure uniform heating and cooling without the residual stresses introduced in laser-based systems.



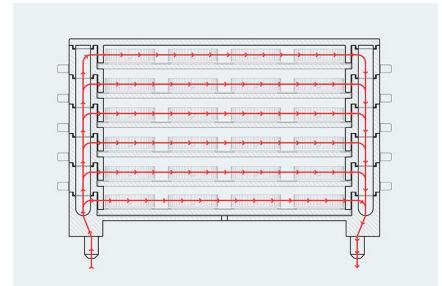
Large Capacity and Easy Access

The furnace opens at the touch of a button providing full access to its high volume chamber - a full 8 x 8 x 12" retort. Unlike tube furnaces, part placement and loading are quick, easy, and safe.



Advanced Graphite Retort Design

An adjustable shelving system allows sintering of multiple levels of parts for efficient batch processing. Thermal uniformity and gas circulation are optimized with a plenum design tuned for all loading conditions.



Uniform temperature up to 1400°C

Multiple heat zones are used to achieve high temperatures and thermal uniformity ($\pm 5^\circ\text{C}$). A 1400°C max temp enables sintering of a wide range of metals to the highest densities achievable. In contrast, furnaces reaching only 1300°C render many steels only 94% dense.

Lowest Gas Usage with Flexible Supply for Low Cost Operation

Parts must be sintered in an oxygen-free environment to achieve good metallurgy. The Studio System uses a vacuum to eliminate oxygen from the furnace chamber. This drastically reduces the volume of gas consumed during sintering. Gas is supplied in small bottles or can be piped to larger supply tanks or a house gas line.



Vapor Management (vacuum pump and binder trap)

As parts are heated in the furnace, all polymer binder remaining in the part is converted to vapor as temperatures rise. Vapors are condensed in a fully integrated binder trap container at the rear of the machine for easy disposal. Without this container, binder vapors would travel through the exhaust line creating environmental and maintenance challenges.



Fabricate™

Fabricate™ software provides an intuitive guide for the user throughout the entire metal 3D printing process. From simplified model prep to part placement instructions, it applies knowledge from world-leading materials scientists and metal 3D printing experts. This takes the guesswork out of achieving high-quality parts with good metallurgical properties.

Simplified Model Preparation

The software guides users through file preparation and optimizes fabrication settings based on user-defined goals.

- Accepts native CAD files or STL for highest fidelity processing
- Shrink factors are calculated in all dimensions
- Optimum build orientation suggested for all 3 process steps
- Interactive toolpath preview
- Supports and interface layers automatically generated

Automated Processing of Print, Debind & Sintering Steps

Fabricate automates even the most challenging aspects of the fabrication process to ensure part quality while eliminating operator burden. Fabricate sends instructions to each device for processing.

- Generation of Separable Supports™ to eliminate Mold-Lock
- Calculated debind times for efficient batch processing.
- Automated sintering profiles tuned to geometry and material
- System monitoring & live updates

Cloud Connected or Local Software

The three-part system is integrated with Fabricate via a secure, cloud-based platform to enable:

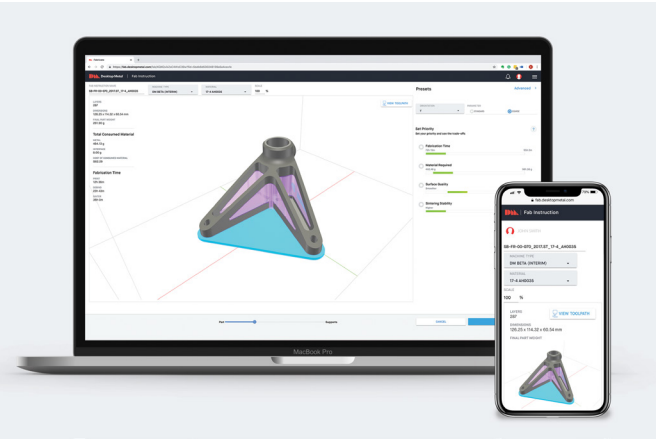
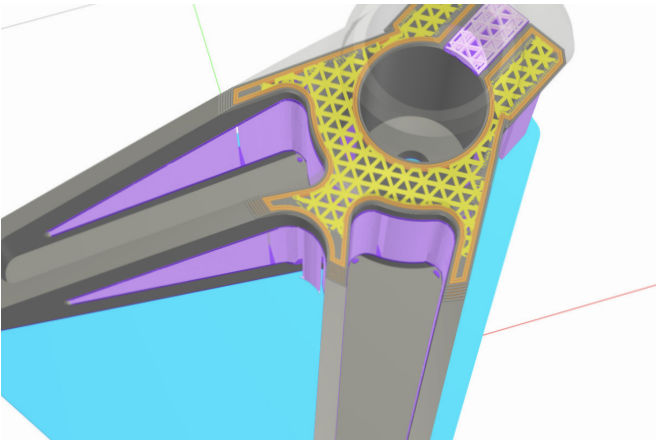
- Multi-device management
- Automatic software updates
- Preventive maintenance & remote support

Expert Metallurgy Built-In

Integrated with intelligence from world-leading material scientists and 3D printing professionals, Fabricate applies expert metallurgy at every step in the process and optimizes fabrication to render high-quality metal parts.

Live Tracking & Alerts

Track parts as they move through fabrication. Fabricate monitors supply levels and notifies users if there is an issue before initiating the cycle.



Studio System Specification

Printer

Reliable BMD extrusion-based print technology	
Max build rate	up to 16 cm ³ /hr (1 in ³ /hr)
Layer height	50 µm (high resolution printhead) 150/220 µm (std resolution printhead)
Build envelope	30 x 20 x 20 cm (12" x 8" x 8")
Power requirements	100-120 VAC, 50/60 Hz, 15 A, 1-phase
Dimensions (H x W x D)	94.8 x 82.3 x 52.9 cm (37.3 x 32.4 x 20.8 in)
Weight	97 kg (214 lbs)
Office-safe operation	

Furnace

Partial-pressure sintering furnace (vacuum-enabled)	
Cycle time	40-48 hours typical
Max temperature	1400 °C
Thermal uniformity	±5 °C at sintering temperatures
Gas used per run	~ 750 Liters
Workload envelope	30 x 20 x 20 cm (12" x 8" x 8")
Graphite retort with 5 adjustable shelves	
Power requirments	208 VAC, 60 Hz, 30 A, 3-phase dedicated circuit NEMA L15-30 plug (4-wire connection)
Gas supply	Small onboard bottles, or connect to house supply
Dimensions (H x W x D)	161.8 x 138.0 x 75.4 cm (63.7 x 54.3 x 29.7 in)
Height in open position	216 cm (85 in)
Weight	798 kg (1,760 lbs)
Office-safe operation	

Debinder

Office-safe low emission design with vapor-tight tank lid	
Cycle time	9-72 hours typical; Varies with part geometry
Workload envelope	30 x 20 x 20 cm (12" x 8" x 8")
3 adjustable shelves	
Power requirements	100-120 VAC, 50/60 Hz, 20 A, 1-phase NEMA 5-20 plug
Dimensions (H x W x D)	102 x 74 x 57 cm (40 x 29 x 23 in)
Height in open position	160 cm (62 in)
Weight	150 kg (330 lbs) without fluid
Office-safe operation	

Fabricate

Manages part fabrication process through each piece of equipment	
Compatible with most native 3D CAD design files or .stl files	
Cloud functionality allows remote monitoring	
Local option allows operation without need for internet access	



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